CLAIMS

1. An electroluminescence generating device comprising
   a. a channel of organic semiconductor material, said channel being able to carry both types of charge carriers, said charge carriers being electrons and holes;
   b. an electron electrode, said electron electrode being in contact with said channel and positioned on top of a first side of said channel layer or within said channel layer, said electron electrode being able to inject electrons in said channel layer;
   c. a hole electrode, said hole electrode being spaced apart from said electron electrode, said hole electrode being in contact with said channel and positioned on top of said first side of said channel layer or within said channel layer, said hole electrode being able to inject holes into said channel;
   d. a control electrode positioned on said first side or on a second side of said channel;

   whereby light emission of said electroluminescence generating device can be acquired by applying an electrical potential difference between said electron electrode and said hole electrode.
2. Device according to claim 1, further comprising a dielectric layer between said channel and said control electrode.
3. Device according to claim 2, wherein said dielectric layer comprises at least one material selected from the group consisting of silicon oxide, alumina, polyimide and polymethylmetacrylate
4. Device according to claim 1, wherein at least one of said electron electrode and said hole electrode comprise at least one different material which is not comprised in the other one.
5. Device according to claim 1, said electron electrode comprises one or more elements selected from the group consisting of Au, Ca, Mg, Al, In, Perovskite Manganites ($Re_{1-x}A_xMnO_3$).

6. Device according to claim 1, wherein said hole electrode comprises at least one material selected from the group consisting of Au, indium tin oxide, Cr, Cu, Fe, Ag, poly(3,4-ethylenedioxythiophene) combined with poly(styrene sulfonate), Perovskite Manganites ($Re_{1-x}A_xMnO_3$).
7. Device according to claim 1, wherein said channel comprises at least one material selected from the group consisting of small molecule materials, polymers and metal complexes.
8. Device according to claim 7 wherein said channel comprises at least one material selected from the group consisting of tetracene, pentacene, perylenes, terthiophene, tetrathiophene, quinquethiophene, sexithiophene, bora-diazaindacene, polyphenylenevinylene, polyfluorene, polythiophene and porphyrins.
9. Device according to claim 1, wherein said channel comprises an amorphous semiconductor material
10. Device according to claim 1, wherein said channel comprises a poly-crystalline semiconductor material
11. Device according to claim 10, whereby said poly-crystalline semiconductor material has a crystal grain size and said hole electrode and said electron electrode are spaced apart at a distance smaller then said grain size.
12. Device according to claim 1, wherein said hole electrode and said electron electrode are spaced apart at a distance between 5 nm and 5 microns.
13. Device according to claim 1, wherein said electron electrode and said hole electrode have digitated structures comprising a regular repetition of a basic finger structure, and are positioned such that said basic finger structures of respectively hole and electron electrodes are alternating each other, and is characterised by two in-plane distances P and R between the basic finger structures.
14. Device according to claim 13, wherein said P and R are equal.

15. Device according to claim 1, wherein said control electrode is an injection control electrode, said injection control electrode being positioned on said second side of said channel, whereby the application of an electrical potential difference between said control electrode and said hole electrode or electron electrode, facilitates the injection of charge carriers into said channel.

16. Device according to claim 1, wherein said control electrode is a current control electrode, said current control electrode being positioned on said second side of said channel, whereby the application of an electrical potential difference between said control electrode and said electron and/or hole electrode allows to control the current of at least one type of charge carriers.

17. Device according to claim 1, wherein said channel comprises more then one sublayers.

18. Device according to claim 17, wherein said channel comprises an electron injection type sublayer, able to facilitate injection of electrons, a hole injection type sublayer, able to facilitate injection of holes, and a recombination type sublayer, able to facilitate recombination of said charge carriers.

19. Device according to claim 1, further comprising optical confinement and/or waveguiding layers on said first and/or said second side of said channel.

20. Device according to claim 1, further comprising optical resonating structures or cavities on said first and/or said second side of said channel.

21. Device according to claim 1, further comprising a flexible or rigid substrate.

22. Device according to claim 1, wherein said channel is a channel formed by sublimation of small molecules.

23. Device according to claim 22, wherein said channel is a channel

formed by simultaneous sublimation of at least two moieties.

24. Device according to claim 1, wherein said channel is a channel formed by solution processing of one or more soluble and/or polymeric materials.

25. Device according to claim 1, whereby said channel is a channel formed by a combination of sublimation and solution processing

26. Device according to claim 1, wherein said channel is a channel formed by thermal, chemical or physical treatment of pre-deposited organic semiconductors.

27. Device according to claim 1, manufactured with printing techniques.

28. A method for generating electroluminescence using a device according to claim 1, by recombination of electrons and holes injected in the channel from said electron electrode and hole electrode.